

Customer No.: 31561
Application No.: 10/707,112
Docket No.: 11761-US-PA

REMARKS

Present Status of the Application

This is a full and timely response to the outstanding non-final Office Action mailed on May 5, 2006. The Office Action has rejected claims 5 and 8-10 under 35 U.S.C. 35 102(e) as being anticipated by Perng et al. (US 6,523,494) and claims 1 and 3 under U.S.C. 103(a) as being unpatentable over Perng et al.

Applicants have amended claim 1 to more clearly define the present invention. After entry of the foregoing amendments, claims 1, 3-5, 8-11 remain pending in the present application. It is believed that no new matter is added by way of these amendments made to the claims or otherwise to the application.

Applicant has most respectfully considered the remarks set forth in this Office Action. Regarding the anticipation and obvious rejections, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the presently pending claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited.

Discussion of Office Action Rejections

The Office Action rejected claims 5 and 8-10 under 35 U.S.C. § 102(e) as being anticipated Perng et al. (USP 6,523,494, Perng hereinafter).

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In order to properly anticipate Applicants' claimed invention under 35 U.S.C. § 102(e), each and every element of the claim in issue must be found, "either expressly or inherently described in a single prior art reference." "The identical invention must be shown in as complete detail as is contained in the ...claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. § 2131. 8th ed., 2001.

Applicants respectively traverse the 102(e) rejection of claims 5 and 8-10 because Perng does not teach every element recited in these claims.

The present invention is in general related to a method of forming a passivation layer directly on a metallic layer, wherein the metallic layer is prevented from structural or electrical damage due to the deposition process. To accomplish such an effect, the present invention teaches forming a passivation layer by "*performing a semi-atmospheric chemical vapor deposition process with liquid tetra-ethyl-ortho-silicate (TEOS) and ozone inside a reaction chamber to form a first passivation layer directly on the metallic layer, wherein the liquid tetra-ethyl-ortho-silicate flowing into the reaction chamber has a flow rate between 500 sccm to 3000 sccm and the ozone flowing into the reaction chamber has a flow rate between 5000 sccm to 15000 sccm*". Fabricating a passivation layer directly on a metallic layer using semi-atmospheric chemical vapor deposition under the claimed processing conditions eliminates the damages that may inflict upon the metallic layer associated with plasma.

On the other hand, Perng teaches, subsequent to the formation of the PECVD liner layer, the surface of the PECVD layer is treated with ozone at a flow rate between 50 sccm to 10 slm

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to enhance its surface sensitivity (col. 11, lines 19-21). Only after the surface of the PECVD layer has been sensitized by the exposure to ozone, a layer of SACVD silicon oxide is formed over the PECVD layer (col. 11, lines 48-50). In essence, Perng teaches a step of surface treatment on the PECVD layer and a step of forming a SACVD layer over the sensitized PECVD layer. The Office, however, asserted that ozone flow rate condition in the surface treatment step of Perng is comparable to the ozone flow rate condition in the SACVD process in forming the first passivation layer directly on the metallic layer of the instant case. The Office further argues that "the surface treatment step is not precluded" in our claims. Applicants respectively disagree. It is unmistakably that the process conditions recited in claim 5 are directed only to the SACVD process in forming the passivation layer. Even if the step of performing the semi-atmospheric chemical vapor deposition process with liquid tetra-ethyl-ortho-silicate (TEOS) and ozone inside a reaction chamber to form a first passivation layer of claim 5 does not preclude a step of surface treatment, the surface treatment would have been done on the metallic layer, rather than a PECVD layer as taught in Perng. Moreover, even if one can assume the ozone flow rate condition in the surface treatment step of Perng can be construed as comparable to the ozone flow rate condition in the step of performing a SACVD process with liquid tetra-ethyl-ortho-silicate (TEOS) and ozone as taught in the instant case, there is no where in Perng that teaches the flow rate of TEOS in the SACVD process being between 500 sccm to 3000 sccm.

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Additionally, Perng teaches the surface treatment step being conducted at a pressure of about 0.5 to 500 torr (col. 11, lines 24-25), while the SACVD process being conducted at a pressure of about 200-700 torr (col. 11, lines 56-60). It is thus obvious from the teachings of Perng that the surface treatment process can not be considered as a part of the SACVD process since the process conditions are entirely different. Therefore, the Office's assertion that the ozone flow condition in the surface treatment of Perng can be construed as equivalent to the ozone flow condition in the SACVD process in forming a passivation layer directly on the metallic layer of the instant case is unsubstantiated.

For at least the above reasons, Applicants respectfully assert that Perng fails to anticipate claim 5. Since claims 8-11 are dependent claims which further define the invention recited in claim 5, respectively, Applicants respectfully assert that these claims also are in condition for allowance. Thus, reconsideration and withdrawal of this rejection are respectfully requested.

The Office Action rejected claims 1 and 3 under 35 U.S.C. § 103(a) as being unpatentable over Perng.

The present invention teaches in claim 1, among other things, "*performing a plasma-enhanced chemical vapor deposition process to form a first passivation layer directly on the metallic layer, wherein the plasma-enhanced chemical vapor deposition process is carried out at a processing pressure between 21 to 25 Torrs and with a processing power between 1 to 45*

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Watt". Fabricating a passivation layer with a higher pressure and a lower processing power reduces the degree of damage to the metallic layers. The present invention specifically teaches on pg. 5, [0020] that "[w]ith a higher pressure, the bombardment on the metallic layer 110 and the device structures 102 by plasma is mitigated when reactive gases are bombarded by plasma for ionizing." The present invention also teaches on pg. 5, [0021] that with a lower processing power, the effect of plasma bombardment is reduced.

Perng, on the other hand, teaches forming a PECVD layer at very low pressure, 1-20 torr, and at very high process power, 50 to 500 W. In other words, Perng teaches away the present invention. As stated in M.P.E.P. § 2144.05, the prima facie case of obviousness based on overlapping ranges may be rebutted by showing the criticality of the claimed range. The prima facie case of obviousness may also be rebutted by showing that the art, in any respect, teaches away from the claimed invention. Not only has the present invention demonstrated that it is critical to form a passivation layer directly on a metallic layer at a high processing pressure and a low processing power in order to mitigate the damage to the metallic layer, the processing pressure range and the processing power range of the instant case lie outside the ranges disclosed by the prior art.

Accordingly, Applicants respectfully submit that claim 1 defines over the prior art reference. As a result, Applicants submit that dependent claim 3 also patentably define over the cite reference because this dependent claim contains all features of the allowable independent claim 5.

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CONCLUSION

For at least the foregoing reasons, it is believed that the presently pending claims 1-5, 8-11 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,



Ding Yu Tan

Registration No.: 58,812

Jianq Chyun Intellectual Property Office
7th Floor-1, No. 100
Roosevelt Road, Section 2
Taipei, 100
Taiwan
Tel: 011-886-2-2369-2800
Fax: 011-886-2-2369-7233
Email: Usa@jciigroup.com.tw